

### LISTING OF THE CLAIMS

**1. (currently amended)** A reaction mixture curable at temperatures above about 60°C to form a light-weight polyisocyanurate foam structure, comprising:

- a) an epoxide resin;
- b) an isocyanate resin;
- c) a tertiary amine catalyst; ~~and~~
- d) a cyclic amine catalyst; and
- e) a bulk filler.

**2. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein the isocyanate resin comprises a mixture of diphenylmethane diisocyanate, methylene bisphenyl isocyanate, and polymethylene polyphenyl isocyanate.

**3. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein the epoxide resin is a resin formed by a condensation reaction between either bisphenol A and epichlorohydrin or bisphenol F and epichlorohydrin.

**4. (previously presented)** The light-weight polyisocyanurate foam structure of claim 3, wherein the quantity of epoxide resin further comprises up to about 50 weight percent of a carboxyl-terminated butadiene acrylonitrile polymer.

**5. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein the tertiary amine is 2,4,6-tris(dimethylaminomethyl)phenol.

**6. (previously presented)** The light-weight polyisocyanurate foam structure of claim 5, wherein the cyclic amine is N,N-dimethylcyclohexylamine.

**7. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein said tertiary amine and said cyclic amine are present in a ratio amount equal to about 2:1 to about 2.8:1 of tertiary-to-cyclic amine and wherein the total quantity of amine is present in an amount equal to about 0.5% to about 0.7% of said isocyanate resin.

**8. (previously presented)** The light-weight polyisocyanurate f foam structure of claim 1, wherein the epoxide resin is present in an amount of about 51% to about 56% of said isocyanate resin.

**9. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein said epoxide resin and said isocyanate resin are present in a ratio amount of about 1:1.8 to about 1:2 of epoxide resin to isocyanate resin.

**10. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, wherein the isocyanate resin is present in an amount of about 60 weight percent to about 65 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**11. (canceled)**

**12. (currently amended)** The light-weight polyisocyanurate foam structure of claim [[11]]1, wherein the bulk filler is present in an amount of about 10 weight percent to about 15 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**13. (previously presented)** The light-weight polyisocyanurate foam structure of claim 12, wherein the bulk filler is selected from the list consisting of glass microspheres, glass-ceramic cenospheres, multi-cellular glass microspheres, polymeric microspheres, and comminuted form of silicon dioxide, mica, and beta eucryptite, and combinations thereof.

**14. (previously presented)** The light-weight polyisocyanurate foam structure of claim 13, wherein the bulk filler further comprises fibers selected from the list consisting of fibers such as carbon fibers, e-glass, s-glass, and aramid fibers, and combinations thereof.

**15. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, further including a surface active agent.

**16. (previously presented)** The light-weight polyisocyanurate foam structure of claim 15, wherein the surface active agent is present in an amount of about 2 weight percent to about 5 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**17. (previously presented)** The light-weight polyisocyanurate foam structure of claim 1, further comprising a quantity of water.

**18. (previously presented)** The light-weight polyisocyanurate foam structure of claim 17, wherein the water is present in amounts of about 0.05 weight percent to about 0.12 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**19. - 38. (canceled)**

**39. (currently amended)** A tool made by a process comprising the steps of:

- a) combining an epoxide resin ~~and~~, an isocyanate resin, and a bulk filler to provide a resin mixture;
- b) adding a mixture of an tertiary amine and a cyclic amine to said resin mixture, said ~~[[amine]]~~amines initiating a reaction between said epoxide resin and said isocyanate resin to form a polymer gel;
- c) dispensing said polymer gel into a mold;
- d) curing the polymer gel at a temperature of about 65°C to provide a polyisocyanurate foam member;
- e) cooling said mold and de-molding said polyisocyanurate foam member;
- f) post-curing the polyisocyanurate foam member by re-heating the polyisocyanurate foam member step-wise to a temperature of about 200°C; and
- g) cooling said post-cured polyisocyanurate foam member to room temperature to provide a post-cured polyisocyanurate foam tool capable of sustaining prolonged exposure to temperatures up to about 200°C while also maintaining a mechanical compressive strength of at least ~~25 MPa~~ 60% of a mechanical compressive strength measured at room temperature.

**40. (original)** The tool of claim **39**, wherein said isocyanate resin comprises a mixture of diphenylmethane diisocyanate, methylene bisphenyl isocyanate, and polymethylene polyphenyl isocyanate.

**41. (previously presented)** The tool of claim **39**, wherein said epoxide resin is resin formed by condensation reaction between a mixture of bisphenol A and epichlorohydrin resins or a mixture of bisphenol F and epichlorohydrin resins.

**42. (original)** The tool of claim **41**, wherein the quantity of epoxide resin further comprises up to about 50 weight percent of a carboxyl-terminated butadiene acrylonitrile polymer.

**43. (original)** The tool of claim **39**, wherein the tertiary amine is 2,4,6-tris(dimethylaminomethyl)phenol.

**44. (original)** The tool of claim **43**, wherein the cyclic amine is N,N-dimethylcyclohexylamine.

**45. (original)** The tool of claim **39**, wherein said quantities of said tertiary amine and said cyclic amine are in a ratio amount equal to about 2:1 to about 2.8:1 of tertiary to cyclic amine, and wherein the total quantity of amine is equal to about 0.5% to about 0.7% of said quantity of said isocyanate resin.

**46. (original)** The tool of claim **39**, wherein the quantity of epoxide resin is about 51% to about 56% of said quantity of isocyanate resin.

**47. (original)** The tool of claim **39**, wherein said epoxide resin and said isocyanate resin are present in a ratio amount of about 1:1.8 to about 1:2 of epoxide resin to isocyanate resin.

**48. (original)** The tool of claim **39**, wherein the isocyanate resin is present in an amount of about 60 weight percent to about 65 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**49. (original)** The tool of claim **39**, wherein said step of combining said epoxide resin and said isocyanate resin further includes adding a quantity of a surface active agent.

**50. (original)** The tool of claim **49**, wherein the surface active agent is present in an amount of about 2 weight percent to about 5 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**51. (currently amended)** The tool of claim **39**, wherein the step of combining further comprises ~~the steps of adding a quantity of a bulk filler to said mixed resin mixture, and~~ incorporating said resin mixture and said bulk filler for about 1 minute.

**52. (original)** The tool of claim **51**, wherein the bulk filler is present in an amount of about 10 weight percent to about 15 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**53. (original)** The tool of claim **52**, wherein the bulk filler is selected from the list consisting of glass microspheres, glass-ceramic cenospheres, multi-cellular glass microspheres,

polymeric microspheres, and comminuted form of silicon dioxide, mica, and beta eucryptite, and combinations thereof.

**54. (original)** The tool of claim **53**, wherein the bulk filler further comprises fibers selected from the list consisting of fibers such as carbon fibers, e-glass, s-glass, and aramid fibers, and combinations thereof.

**55. (original)** The tool of claim **51**, wherein the bulk filler is present in an amount of about 10 weight percent to about 15 weight percent of said epoxide resin, said isocyanate resin, and said tertiary and cyclic amines.

**56. (original)** The tool of claim **39**, wherein said step of combining said epoxide resin and said isocyanate resin further includes adding a quantity of water.

**57. (original)** The tool of claim **39**, wherein the step of post-curing further comprises the step of increasing the temperature of said cured foam member to 200°C over a period of at least about 36 hours.

**58. (currently amended)** The tool of claim **57**, wherein the step of increasing said temperature further comprises the steps of:

- a) heating the cured foam member to ~~the~~ 65°C for about 2 hours;
- b) increasing the temperature of the cured foam member up to 150°C over about 8 hours and holding the temperature of the cured foam member at about [[to]] 150°C for an additional 5 hours;

- c) increasing the temperature of the cured foam member to about 180°C over about 8 hours and holding the temperature of the cured foam member at about ~~[[to]]~~ 180°C for an additional 5 hours;
- d) increasing the temperature of the cured foam member to about 200°C over about 5 hours and holding the temperature of the cured foam member at about ~~[[to]]~~ 200°C for an additional 5 hours;
- e) decreasing the temperature of the cured foam member to about ~~[[to]]~~ 65°C over about 5 hours and holding the temperature of the cured foam member at about ~~[[to]]~~ 65°C for an additional 1 hour; and
- f) cooling the temperature of the cured foam member to room temperature.

**59. (original)** The tool of claim 58, further including the step of milling or shaping one or more surfaces to provide a 3-dimensional tool contour.

**60. – 63. (canceled)**

**64. (currently amended)** A tool made by a process comprising the steps of:

- a) combining an epoxide resin ~~and~~, an isocyanate resin, and a bulk filler to provide a resin mixture;
- b) adding a mixture of an tertiary amine and a cyclic amine to said resin mixture, said ~~[[amine]]~~amines initiating a reaction between said epoxide resin and said isocyanate resin to form a polymer gel;
- c) applying said polymer gel onto a surface;
- d) curing the polymer gel at a temperature of about 65°C to provide a polyisocyanurate foam layer;
- e) cooling said polyisocyanurate foam layer;



- f) post-curing the polyisocyanurate foam layer by re-heating the polyisocyanurate foam member step-wise to a temperature of about 200°C; and
- g) cooling said post-cured polyisocyanurate foam layer to room temperature, to provide a foam tool capable of sustaining prolonged exposure to temperatures up to about 200°C while also maintaining a mechanical compressive strength of at least ~~25 MPa~~ 60% of a mechanical compressive strength measured at room temperature.

**65. (original)** The tool of claim **64**, wherein the step of applying further comprises spraying said foam gel onto said surface.

**66. (previously presented)** A high temperature insulation medium comprising the light-weight polyisocyanurate foam structure of claim **12**.

**67. (canceled)**